UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Ex parte EDUARD GAST, BERNHARD SCHMID and PETER SEMMIER

Appeal No. 2006-0794
Application 09/646,767

ON BRIEF

Before KIMLIN, WARREN and JEFFREY T. SMITH, *Administrative Patent Judges.*

WARREN, *Administrative Patent Judge.*

Decision on Appeal

This is an appeal under 35 U.S.C. § 134 from the decision of the examiner finally rejecting claims 1 through 4 and 9 through 22. Claims 5 through 8 and 23 are also of record and have been held by the examiner to contain allowable subject matter.

Claims 1 and 9 illustrate appellants' invention of a propellant for gas generators, and are representative of the claims on appeal. These claims, as they stand of record,[1] read as follows:

1. Propellant for gas generators, comprising

(a) at least one fuel selected from the group consisting of guanidine nitrate, dicyanamide, ammonium dicyanamide, sodium dicyanamide, copper dicyanamide, tin dicyanamide, calcium dicyanamide, guanidine dicyanamide, aminoguanidine bicarbonate, aminoguanidine nitrate,

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[1] In claim 1, the term "5-nitro-1,2,4-triazole-3-on" in clause "(a)" should read "5-nitro-1,2,4-triazole-3-one" and the second appearing term "alkaline earth metal chlorate" in clause "(b)" should apparently be "alkaline earth metal perchlorate."

triaminoguanidine nitrate, nitroguanidine, dicyandiamide, azodicarbonamide, tetrazole, 5-aminotetrazole, 5-nitro-1,2,4-triazole-3-on, salts and mixtures thereof;

(b) at least one of an alkali metal nitrate, an alkaline earth metal nitrate, ammonium nitrate, an alkali metal chlorate, an alkaline earth metal chlorate, ammonium chlorate, an alkali metal perchlorate, an alkaline earth metal chlorate, or ammonium perchlorate, and

(c) at least one essentially chemically-inert slag trap with a high fusion point, said slag trap being at least one of Al_2O_3, TiO_2, or ZrO_2 particles formed by a gas phase reaction so as to have a specific surface area of at least about 40 m^2g.

9. Propellant for gas generators according to claim 1, wherein component (a) is nitroguanidine, component (b) is strontium nitrate and component (c) is highly dispersed Al_2O_3, TiO_2, or ZrO_2.

The references relied on by the examiner are:

Yoshida et al. (Yoshida)	5,827,996	Oct. 27, 1998
Matsuda et al. (Matsuda)	6,149,745	Nov. 21, 2000
Yamato	6,190,474	Feb. 20, 2001 (filed May 14, 1998)

The examiner has rejected appealed claims 1 through 4 and 9 through 22 under 35 U.S.C. § 103(a) as being unpatentable over Matsuda in view of Yoshida (answer, pages 3-4) and over Yamato in view of Yoshida (answer, pages 4-5).

Appellants argue claims 1 through 4 and 10 through 21 as a group and claims 9 and 22 as a group with respect to both grounds of rejection (brief, page 5). Thus, we decide this appeal based on appealed claims 1 and 9 as representative of the grounds of rejection and appellants' groupings of claims. 37 CFR § 41.37(c)(1)(vii) (September 2004).

We affirm.

Rather than reiterate the respective positions advanced by the examiner and appellants, we refer to the answer and to the brief and reply brief for a complete exposition thereof.[2,3,4]

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[2] Contrary to appellants' statement in the brief (page 2), the response filed March 16, 2004, was entered and considered by the examiner as set forth in the advisory action mailed April 1, 2004.

[3] We have not considered the arguments presented in the amendment filed November 6, 2003, and the response filed March 16, 2004, which appellants incorporate into the brief, the former "[t]o the extent they still apply" (page 5). Indeed, 37 CFR § 41.37(c)(1)(vii) (September 2004) provides in pertinent part:

> The contentions of appellant with respect to each ground of rejection presented for review in paragraph (c)(1)(vi) of this section, and the basis therefor, with citations of the statutes, regulations, authorities, and parts of the record relied on. Any arguments

Opinion

We have carefully reviewed the record on this appeal and based thereon find ourselves in agreement with the supported position advanced by the examiner that, *prima facie*, the claimed propellant for gas generators encompassed by claims 1 and 9 would have been obvious over the combined teachings of Matsuda and Yoshida and of Yamato and Yoshida to one of ordinary skill in this art at the time the claimed invention was made. Accordingly, since a *prima facie* case of obviousness has been established by the examiner, we again evaluate all of the evidence of obviousness and nonobviousness based on the record as a whole, giving due consideration to the weight of appellants' arguments in the brief and reply brief. *See generally, In re Oetiker*, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); *In re Piasecki*, 745 F.2d 1468, 1472, 223 USPQ 785, 788 (Fed. Cir. 1984).

The principal issues in this appeal involve the language of claim 1, clause (c), and claim 9. We give the terms thereof the broadest reasonable interpretation in their ordinary usage in context as they would be understood by one of ordinary skill in the art in light of the written description in the specification unless another meaning is intended by appellants as established in the written description of the specification, and without reading into the claims any limitation or particular embodiment disclosed in the specification. *See, e.g., In re Am. Acad. of Sci. Tech. Ctr.*, 367 F.3d 1359, 1364, 70 USPQ2d 1827, 1830 (Fed. Cir. 2004); *In re Morris*, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997); *In re Zletz*, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989).

The plain language of the subject clause specifies the presence of some amount, however small, of "at least one of Al_2O_3, TiO_2, or ZrO_2 particles formed by a gas phase reaction so as to

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or authorities not included in the brief or a reply brief filed pursuant to § 41.41 will be refused consideration by the Board, unless good cause is shown.

[4] In the brief, appellants refer to statements and positions allegedly made and taken by the examiner at the interview of March 16, 2004. The examiner disputes appellants' summary of the interview in the advisory action mailed April 1, 2004 (page 2), and in the answer (page 5), appellants' allegations with respect to the interview in the brief. In any event, the position of the examiner on appeal is that stated in the answer. 37 CFR § 41.39(a)(1) (September 2004). Thus, we consider appellants' arguments to the extent that they apply to the examiner's position in the answer.

have a specific surface area of at least about 40 m^2g" which have the property of being "essentially chemically-inert slag trap with a high fusion point," with claim 9 adding the limitation that these particles further have the property of being "highly disperse." The metal oxide involved in the issues in this appeal is TiO_2.

Appellants disclose in the written description in the specification that "gas phase reaction" is "flame hydrolysis" which provides particles of TiO_2 having the specified surface area in "highly dispersed form" compared to "[m]etal oxides prepared according to processes such as a wet process" that provides "a small particle size" that can be "in finely divided form" but not "'highly dispersed' according to the present definition" (specification, page 9, first and second full paragraphs, the first as amended in the amendment filed September 19, 2000, page 2). The "present definition" is "the 'highly dispersed' metal oxides are prepared according to a specific process, *i.e.*, flame hydrolysis" (*id.*). Appellants acknowledge that such "highly dispersed oxides are commercially available" (*id.*). Appellants further define "slag trap" to mean "an essentially chemically-inert metal oxide which has a high fusion point and is in highly dispersed form, i.e. these oxides have in comparison to oxides in conventional form a much higher surface [*sic*, area]" (specification, page 9, third full paragraph). Appellants further disclose that "conventional pigment-TiO_2 has a BET-surface [*sic*, area] of only 5-10 m^2/g . . . whereas the meal oxides used . . . according to the present invention have a BET-surface [*sic*, area] of about 40 up to about 100 m^2/g" (*id.*, page 10, first full paragraph). Appellants further define "essentially chemically-inert compounds, i.e. the slag traps . . . do not take part in chemical reactions during the burn-up reaction of the propelling charges of the gas generators or do not take part only to a small degree on the surface of the metal oxides used as the slag trap" (*id.*, paragraph bridging pages 10-11).

We notice that the two principal methods of preparing TiO_2 that were known in the prior art are the wet processes and flame hydrolysis.[5] *See In re Ahlert*, 424 F.2d 1088, 1091-92, 165 USPQ 418, 420-21 (CCPA 1970) (notice may be taken "of facts beyond the record which, while not generally notorious, are capable of such instant and unquestionable demonstration as to defy dispute").

[5] *See generally*, "Titanium Compounds (Inorganic)," 24 *Kirk-Othmer Encyclopedia of Chemical Technology* 237-38 (4th ed., New York, John Wiley & Sons. 1997).

According to the context of the claim language and the written description in the specification, we find that TiO_2 particles prepared according to the known method of flame hydrolysis is in a highly dispersed particulate form with a BET specific surface area of about 40 m^2/g and have the properties of being an essentially chemically-inert slag trap with a high fusion point. Thus, the propellant products encompassed by claims 1 and 9 are defined in part by product-by-process language which must be given effect. S*ee generally, In re Thorpe*, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985).

Furthermore, the transitional term "comprising" opens the claims to encompass propellant products that include any manner and amount of any other ingredients. *See generally, Exxon Chem. Pats., Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 1555, 35 USPQ2d 1801, 1802 (Fed. Cir. 1995) ("The claimed composition is defined as comprising - meaning containing at least - five specific ingredients."); *In re Baxter*, 656 F.2d 679, 686-87, 210 USPQ 795, 802-03 (CCPA 1981) ("As long as one of the monomers in the reaction is propylene, any other monomer may be present, because the term 'comprises' permits the *inclusion* of other steps, elements, or materials.").

The examiner's basic position (answer, pages 3-5, 5-6 and 8) is that it would have been obvious to one of ordinary skill in this art to modify the propellant compositions of Matsuda (e.g., col. 2, l. 12, to col. 3, l. 9) and of Yamato (e.g., col. 1, l. 63, to col. 3, l. 23) by including therein TiO_2 having a BET specific surface area of at least 40 m^2/g disclosed by Yoshida in the reasonable expectation that the oxide can "serve mainly . . . reduce the concentrations of CO and/or NOx in the gas" as taught by Yoshida (e.g., col. 5, ll. 19-26, 31, 34, 37, 41 and 43-46; see also, e.g., col. 2, l. 42, to col. 7, l. 42). We find that Yoshida also provides the further teaching that said oxide would additionally "serve mainly to decrease the burning temperature" (col. 5, ll. 24-25).

Appellants submit that there is no motivation to combine Yoshida with Matsuda or Yamato (brief, pages 6-11). With respect to Matsuda, appellants argue that the reference would not have taught the reduction of CO and NOx concentrations or the use of titanium fibers for "scavenging" solid products resulting from gas generation. We note that appellants contend as to the former, that "Yoshida does not teach that the burning catalyst actually interacts with CO

and NOx, only that it 'decrease[s] the burning temperature' so as to 'reduce the concentration of CO and NOx," citing col. 5, ll. 24-26. Appellants further contend with respect to the latter, that Matsuda would not have disclosed TiO_2 in any form, and that Matsuda's "scavenging" function is not Yoshida's catalyst function. With respect to Yamato, appellants argue that the examiner provides no reason for the combination.

Appellants further submit that the combinations of applied references fail to provide all of the claim limitations, pointing out that the claimed slag trap particles must be "formed by a gas phase reaction" in claim 1 and "highly dispersed" in claim 9, and there is no evidence that any of the references provide such particles (brief, pages 11-13). Appellants argue that there is no reasonable expectation that the combination of the primary references with Yoshida "would inherently yield a composition capable of trapping slag produced during burning of a" propellant composition (*id.*, pages 13-14). In this respect, appellants further contend that the examiner has provided no evidence that the particles of Yoshida would inherently function as a slag tap, and particularly since the claimed slag traps are formed by a gas phase reaction and are highly disperse, thus arguing that different results would be obtained (*id.*, pages 15-18). Appellants also argue that Matsuda "appears to teach away" since the reference discloses that ceramic fibers or whiskers have different scavenging properties than particles at col. 2, ll. 59-63 (*id.*, pages 18-21). Appellants submit that the disclosure in the application evinces that "'slag trap . . . particles' . . . are capable of acting as an 'internal filter' that traps slag" which "is an unexpected result in view of any teachings" in the prior art (*id.*, pages 21-22).

The examiner responds that propellant compositions of Matsuda and of Yoshida are similarly used in air bags, and one of ordinary skill in the art would have applied the combined teachings of the propellant compositions to obtain propellant compositions, citing, among others, *In re Kerkhoven*, 626 F.2d 846, 850, 205 USPQ 1069, 1072 (CCPA 1980). The examiner points out that Yoshida would have disclosed the same surface area for TiO_2 as claimed, and that such an ingredient would have the "same effect" as claimed (*id.*, page 6). The examiner further argues that it would have been obvious to use Yoshida's TiO_2 "with Matsuda with and without the use of the fibers disclosed by Matsuda" as the motivation to combine is taught by the reference and need not be appellants' motivation (id.). The examiner further points out that the

product-by-process claim language "refers to the formation of the oxide with a high surface area," which establishes that the claimed TiO_2 is the same or obvious from the TiO_2 of Yoshida, citing *Thorpe*, 777 F.2d at 697, 227 USPQ at 966 (*id.*, page 7). The examiner takes the same position with respect to appellants' arguments raised with respect to the combination of Yamato and Yoshida (*id.*, pages 7-8).

Appellants reply that the applied references do not establish the claim limitations in claim 1, clause (c), and claim 9, pointing to the same disclosure in the specification which we considered above with respect to the same claim language (reply brief, pages 2-4). Appellants contend that the examiner has not established the "use of metal oxides particles or fibers to trap molten and/or particulate slag," which particles have the claimed properties, thus, ignoring these claim limitations (*id.*, page 4). Appellants further contend that the examiner has not established that Yoshida's TiO_2 particles having a BET specific surface area of about 40 m^2/g "are, in fact, formed by a 'gas phase reaction," pointing out that "[m]etal oxide particles formed by a 'gas phase reaction' are different and have unique properties compared to those made by a 'wet process,'" or are inherently taught by the applied prior art (*id.*, pages 5-9).

On this record, we find substantial evidence in the combined teachings of Matsuda and Yoshida and of Yamato and Yoshida supporting the examiner's position. The sole difference between the claimed propellant compositions for use in air bags and the propellant compositions for the same purpose that would have been disclosed to one of ordinary skill in this art by Matsuda and Yamato is that the claimed propellant compositions must have some amount, however small, of, among others, finely divided TiO_2 particles having a specific surface area of at least about 40 m^2g formed by a gas phase reaction. In this respect, there is no dispute that the nitrogen containing fuel ingredients specified in clause (a) of claim 1 and the oxidizing agent ingredients specified in clause (b) of claim 1 are disclosed by Matsuda and Yamato. Any other ingredients that are taught by Matsuda and Yamato would not be excluded from the claimed propellant compositions because of the transitional term "comprising." Appellants also do not

argue that one of ordinary skill in this art would have considered urazol,[6] the nitrogen containing fuel ingredient of Yoshida, to be non-analogous to the nitrogen containing fuel ingredients of Matsuda and Yamato or that the oxidizing agent ingredients of Yoshida differ from those of the other two references.

We find that Yoshida would have taught one of ordinary skill in this art that the propellant compositions thereof can contain, among other additional ingredients, a burning catalyst which can be oxide particles having a BET specific surface area of at least about 40 m^2g, such as TiO_2. *See generally*, *Merck & Co., Inc. v. Biocraft Labs., Inc.*, 874 F.2d 804, 807, 10 USPQ2d 1843, 1845-46 (Fed. Cir. 1989) ("That the '813 patent discloses a multitude of effective combinations does not render any particular formulation less obvious. This is especially true because the claimed composition is used for the identical purpose. [Citations omitted.]"). Contrary to appellants reading of Yoshida, the reference discloses that the burning catalyst both decreases the burning temperature and reduces the concentration of CO and NOx in the gas (col. 5, ll. 24-26; see also col. 2, ll. 43-46).

On this basis, we agree with the examiner that, *prima facie*, one of ordinary skill in this art would have combined each of Matsuda and Yamato with Yoshida in view of the similar nitrogen containing fuel ingredients and the same oxidizing agent ingredients for the common purpose of preparing propellant compositions for air bags. *See generally*, *In re Kahn*, 441 F.3d 977, 985-88, 78 USPQ2d 1329, 1334-37 (Fed. Cir. 2006). We further agree that, *prima facie*, the combined teachings of each set of references would have reasonably suggested to this person to combine the propellant compositions having the fuel and oxidizing agent ingredients of Matsuda and of Yamato with the burning catalyst TiO_2 particles having a BET specific surface area of at least about 40 m^2g of Yoshida in the reasonable expectation of obtaining propellant compositions which have the properties provided by said burning catalyst taught by Yoshida. *See In re Corkill*, 771 F.2d 1496, 1497-1500, 226 USPQ 1005, 1006-08 (Fed. Cir. 1985); *In re Longi*, 759 F.2d 887, 897, 225 USPQ 645, 651-52 (Fed. Cir. 1985); *Kerkhoven*, 626 F.2d at 850, 205 USPQ at

[6] Urazol is also known as "urazole," that is, 1*H*-1,2,4-triazole-3,5(2*H*,4*H*)-dione. *See* Monograph 10004. Urazole, *The Merck Index* 1683 (Twelfth Ed., Whitehouse Station, New Jersey, Merck & Co., Inc. 1996) (copy not provided).

1072, and case cited therein; *In re Skoll*, 523 F.2d 1392, 1397-98, 187 USPQ 481, 484-85 (CCPA 1975); *In re Castner*, 518 F.2d 1234, 1238-39, 186 USPQ 213, 217 (CCPA 1975); *In re Lintner*, 458 F.2d 1013, 1015-16, 173 USPQ 560, 562-63 (CCPA 1972); *see also In re O'Farrell*, 853 F.2d 894, 903-04, 7 USPQ2d 1673, 1680-81 (Fed. Cir. 1988) ("Obviousness does not require absolute predictability of success. . . . There is always at least a possibility of unexpected results, that would then provide an objective basis for showing the invention, although apparently obvious, was in law nonobvious. [Citations omitted.] For obviousness under § 103, all that is required is a reasonable expectation of success. [Citations omitted.]"); *In re Dow Chem. Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1531 (Fed. Cir. 1988) ("The consistent criterion for determination of obviousness is whether the prior art would have suggested to one of ordinary skill in the art that [the claimed process] should be carried out and would have a reasonable likelihood of success, viewed in light of the prior art. [Citations omitted] Both the suggestion and the expectation of success must be founded in the prior art, not in the applicant's disclosure."); *In re Keller*, 642 F.2d 413, 425, 208 USPQ 871, 881 (CCPA 1981)("The test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art.").

We are mindful that Yoshida would not have disclosed to one of ordinary skill in this art the manner in which TiO_2 particles having a BET specific surface area of at least about 40 m^2/g are prepared or that the particles have the other properties specified in claim 1, clause (c), and claim 9. However, as we found above, appellants state in the written description in the specification that TiO_2 particles prepared by flame hydrolysis have a particle size in the range disclosed in Yoshida while those prepared by the so-called "wet" processes do not, and such flame hydrolysis prepared TiO_2 particles further exhibit the claimed properties. As we further found above, appellants acknowledged that such flame hydrolysis prepared TiO_2 particles were commercially available.

Thus, we determine that one of ordinary sill in this art routinely following the teachings of Yoshida to use TiO_2 particles having a BET specific surface area of at least about 40 m^2/g

would have purchased commercially available TiO_2 particles having that property. Therefore, we are convinced that one of ordinary skill in this art following the combined teachings of Matsuda and Yoshida and of Yamato and Yoshida would have reasonably arrived at the claimed propellant compositions encompassed by appealed claims 1 and 9, including each and every limitation thereof arranged as required therein, without resort to appellants' specification, even though the references would not have disclosed and the commercial interests may not have disclosed the properties of the TiO_2 particles that appellants rely on for patentability. *See In re Kronig*, 539 F.2d 1300, 1304, 190 USPQ 425, 428, (CCPA 1976) (The reference provides "ample motivation to add water to increase product yields, and we do not view the rejection as deficient merely because appellants allege a different advantage resulting from the addition of water. Obviousness under 35 USC 103 does not require absolute predictability, . . . and it is sufficient here that [the reference] clearly [suggests] doing what appellants have done. [Citations omitted.]")

Indeed, we are not convinced otherwise by appellants' arguments. We agree with the examiner that contrary to appellants' position, the motivation to one of ordinary skill in this art to combine the references and arrive at the same propellant compositions as claimed need not be for the reasons set forth in the primary reference or for the reasons that appellants arrived at the claimed composition, but for the reasons provided to this person by the combined teachings of the references as a whole. Indeed, the properties that this person desires based on the combined teachings of the references need not be for a purpose or property that appellants rely on for patentability. *See Kronig*, 539 F.2d at 1304, 190 USPQ at 428; *see also In re Kemps*, 97 F.3d 1427, 1429-30, 40 USPQ2d 1309, 1311 (Fed. Cir, 1996); *In re Beattie*, 974 F.2d 1309, 1312, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992); *In re Dillon*, 919 F.2d 688, 693, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990) (*en banc*). In this respect, it is well settled that the mere discovery of a new property of a composition will not, without more, be dispositive of the nonobviousness of the claimed invention over the applied references. *See, e.g., In re Spada*, 911 F.2d 705, 708, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990); *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 782-83, 227 USPQ 773, 779 (Fed. Cir. 1985).

Furthermore, on this record, and indeed, in view of appellants' admissions that commercially TiO_2 particles having a BET specific surface area of at least about 40 m^2/g are produced by flame hydrolysis and have the properties specified in the claims, the examiner is on firm factual foundation to find that it reasonably appears that the TiO_2 particles having a BET specific surface area of at least about 40 m^2/g taught by Yoshida are identical or substantially identical to the claimed TiO_2 particles. Appellants thus have the burden to establish otherwise even though the grounds of rejection are under § 103(a). *See, e.g., In re Best*, 562 F.2d 1252, 1255-56, 195 USPQ 430, 433-34 (CCPA 1977)("Where, as here, the claimed and prior art products are identical or substantially identical, or are produced by identical or substantially identical processes, the PTO can require an applicant to prove that the prior art products do not necessarily or inherently possess the characteristics of his claimed product. See *In re Ludtke*, [441 F.2d 660, 169 USPQ 563 (CCPA 1971)]. Whether the rejection is based on 'inherency' under 35 USC 102, on 'prima facie obviousness' under 35 USC 103, jointly or alternatively, the burden of proof is the same, and its fairness is evidenced by the PTO's inability to manufacture products or to obtain and compare prior art products. [Footnote and citation omitted.]"); *In re Skoner*, 517 F.2d 947, 950, 186 USPQ 80, 82 (CCPA 1975) ("Appellants have chosen to describe their invention in terms of certain physical characteristics . . . . Merely choosing to describe their invention in this manner does not render patentable their method which is clearly obvious in view of [the reference]. [Citation omitted.]"); *cf. Spada*, 911 F.2d at 708-09, 15 USPQ2d at 1657-58 ("The Board held that the compositions claimed by Spada 'appear to be identical' to those described by Smith. While Spada criticizes the usage of the word 'appear', we think that it was reasonable for the PTO to infer that the polymerization by both Smith and Spada of identical monomers, employing the same or similar polymerization techniques, would produce polymers having the identical composition.").

On this record, appellants have not carried their burden. Indeed, the brief and reply brief are replete with arguments emphasizing the difference between "wet" and "gas phase" processes for preparing TiO_2 particles, reinforcing the disclosure in the written description in the specification which makes clear that it is the latter method which provides TiO_2 particles having a BET specific surface area of at least about 40 m^2/g area taught by Yoshida. We note here that,

as we found above, appellants disclose in the written description in the specification that the claimed TiO_2 particles are "essentially chemically-inert compounds" in that they take part in chemical reactions "only to a small degree on the surface of the metal oxides," which, on this record, we find to be consistent with the disclosure of the same particles as a "burning catalyst" by Yoshida.

We further find that the evidence in the specification relied on by appellants to show "unexpected results" (brief, pages 21-22) is based on the properties provided to the propellant compositions by the TiO_2 particles as claimed, and do not constitute a comparison of the claimed compositions vis-à-vis the teachings of the prior art applied by the examiner. Thus, the evidence is entitled to little, if any, weight for appellants' purposes here. *See In re Hoch*, 428 F.2d 1341, 1343-44, 166 USPQ 406, 409 (CCPA 1970) (evidence must provide an actual comparison of the properties of the claimed compositions with compositions of the reference); *see also In re Baxter Travenol Labs.*, 952 F.2d 388, 392, 21 USPQ2d 1281, 1285 (Fed. Cir. 1991) ("[W]hen unexpected results are used as evidence of nonobviousness, the results must be shown to be unexpected compared with the closest prior art. [Citation omitted.]"); *In re Burckel*, 592 F.2d 1175, 1179-80, 201 USPQ 67, 71 (CCPA 1979) (the claimed subject matter must be compared with the closest prior art in a manner which addresses the thrust of the rejection).

Accordingly, based on our consideration of the totality of the record before us, we have weighed the evidence of obviousness found in the combined teaching of Matsuda and Yoshida and of Yamato and Yoshida with appellants' countervailing evidence of and argument for nonobviousness and conclude that the claimed invention encompassed by appealed claims 1 through 4 and 9 through 22 would have been obvious as a matter of law under 35 U.S.C. § 103(a).

The examiner's decision is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2005).

AFFIRMED

EDWARD C. KIMLIN)
Administrative Patent Judge)
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)
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